

WHAT IS CLAIMED IS:

1. A magnetic memory device having a packaged magnetic memory chip, comprising:

5 a package structure including a magnetic memory chip; and

a magnetic guide of a high-permeability magnetic material, forming a structural member of the package structure.

2. A magnetic memory device according to claim 1,  
10 wherein the package structure includes a lead frame on which the magnetic memory chip is bonded by a die bonding agent and a resin which seals the bonded magnetic memory chip, and wherein at least one of the lead frame, the die bonding agent and the sealing resin  
15 forms the magnetic guide containing a high-permeability magnetic material.

3. A magnetic memory device according to claim 2, wherein the lead frame are made of a conductive high-permeability magnetic material.

20 4. A magnetic memory device according to claim 3, wherein the high-permeability magnetic material of the lead frame includes a grain-oriented electrical steel, permalloy, a permalloy alloy with elements added, a metal crystal material, a metal amorphous foil, and  
25 a ferrite material.

5. A magnetic memory device according to claim 4, wherein the metal crystal material includes sendust and

Finemet.

6. A magnetic memory device according to claim 2,  
wherein inner lead portions of the lead frame are  
plated with a precious metal, and outer lead portions  
5 of the lead frame are plated with a precious metal or  
solder.

7. A magnetic memory device according to claim 2,  
wherein the lead frame comprises a frame body of Cu or  
Fe, whose surface is covered with a high-permeability  
10 magnetic material film functioning as the magnetic  
guide.

8. A magnetic memory device according to claim 7,  
wherein the high-permeability magnetic material film is  
formed by plating, vacuum deposition or sputtering.

15 9. A magnetic memory device according to claim 7,  
wherein the high-permeability magnetic material film is  
formed of a resin paste containing a high-permeability  
magnetic powder.

10 10. A magnetic memory device according to claim 9,  
wherein the high-permeability magnetic powder includes  
ferrite.

11. A magnetic memory device according to claim 2,  
wherein the resin is mixed with a high-permeability  
magnetic particulate.

25 12. A magnetic memory device according to  
claim 11, wherein the high-permeability magnetic  
particulate includes ferrite of spinel type and ferrite

of garnet type.

13. A magnetic memory device according to claim 11, wherein the high-permeability magnetic particulate includes a resin with Mn-Zn ferrite and an additive, and a resin with yttrium iron garnet and an additive.

14. A magnetic memory device according to claim 2, wherein a portion of the resin contacted by an outer lead portion of the lead frame is made of a normal resin not containing a magnetic material, while other portion of the resin is made of resin mixed with a high-permeability magnetic material particulates.

15. A magnetic memory device according to claim 1, wherein a plurality of the magnetic memory chips are stacked in a multi-layer form and sealed by a resin.

16.. A magnetic memory device according to claim 15, wherein each of adjacent those of the magnetic memory chips is bonded by a die bonding agent, and a lowermost magnetic memory chip is bonded on a lead frame by a die bonding agent.

17. A magnetic memory device according to claim 15, wherein at least one of the die bonding agents which bond the adjacent magnetic memory chips and the die which bonds agent bonding the lowermost magnetic memory chip and the lead frame contains a high-permeability magnetic powder.

18. A magnetic memory device according to claim 15, wherein at least one of the die bonding agents which bond the adjacent magnetic memory chips and the die bonding agent which bonds the lowermost  
5 magnetic memory chip and the lead frame comprises a sheet member having a foil member of a high-permeability magnetic material held between two adhesive resin sheets.

19. A magnetic memory device according to claim 15, wherein at least one of an upper portion of  
10 the resin which covers an upper surface of the stacked magnetic memory chip and a lower portion of the resin which covers a lower surface of the stacked magnetic memory chip is mixed with a high-permeability magnetic  
15 particulate.

20. A magnetic memory device according to claim 19, wherein the high-permeability magnetic particulate includes ferrite of spinel type and ferrite of garnet type.

21. A magnetic memory device according to claim 19, wherein the high-permeability magnetic particulate includes a resin with Mn-Zn ferrite and an additive, and a resin with yttrium iron garnet and an additive.

22. A magnetic memory device according to claim 15, wherein a portion of the resin contacted by an outer lead portion of the lead frame is made of a

normal resin not containing a magnetic material, while other portion of the resin is made of resin mixed with a high-permeability magnetic material particulates.

23. A magnetic memory device according to claim 1,  
5 wherein the package structure includes a heat sink having a central portion on which the magnetic memory chip is bonded by a die bonding agent, a wiring board bonded on a peripheral portion of the heat sink, to which terminals of the magnetic memory chip are lead-  
10 out, and a resin which seals the magnetic memory chip, and wherein at least one of the heat sink, the die bonding agent and the sealing resin forms the magnetic guide containing a high-permeability magnetic material.

24. A magnetic memory device according to  
15 claim 23, wherein the heat sink comprises a heat sink body of Cu or Al, whose surface is covered with a high-permeability magnetic material film functioning as the magnetic guide.

25. A magnetic memory device according to  
20 claim 24, wherein the high-permeability magnetic material includes ferrite of spinel type and ferrite of garnet type.

26. A magnetic memory device according to  
claim 24, wherein the high-permeability magnetic  
25 material includes a resin with Mn-Zn ferrite and an additive, and a resin with yttrium iron garnet and an additive.

27. A magnetic memory device according to claim 1,  
wherein the package structure includes a base board in  
which leading-out wires are formed and on which the  
magnetic memory chip is bonded by a die bonding agent,  
5 and a resin which seals the magnetic memory chip, and  
wherein at least one of the base board, the die bonding  
agent and the sealing resin forms a magnetic guide  
containing a high-permeability magnetic material.

28. A magnetic memory device according to  
10 claim 27, wherein the magnetic memory chip is face-down  
bonded on the base board.

29. A magnetic memory device according to  
claim 27, wherein the base board is made of a high-  
permeability magnetic material and functions as the  
15 magnetic guide.

30. A magnetic memory device according to  
claim 27, wherein the base board is made of a material  
containing no magnetic particulates, and the resin is  
mixed with high-permeability magnetic particulates and  
20 functions as the magnetic guide.

31. A magnetic memory device according to  
claim 30, wherein the high-permeability magnetic  
material includes ferrite of spinel type and ferrite of  
garnet type.

25 32. A magnetic memory device according to  
claim 30, wherein the high-permeability magnetic  
material includes a resin with Mn-Zn ferrite and

an additive, and a resin with yttrium iron garnet and an additive.

33. A magnetic memory device according to claim 1,  
wherein the package structure includes a base board  
5 in which leading-out wires are formed and on a chip  
mounting depression of which the magnetic memory chip  
is bonded by a die bonding agent, and a resin which  
seals the magnetic memory chip, and wherein at least  
one of the base board, the die bonding agent and  
10 the sealing resin forms a magnetic guide containing  
a high-permeability magnetic material.

34. A magnetic memory device according to  
claim 33, wherein the base board is made of a high-  
permeability magnetic material and functions as the  
15 magnetic guide.

35. A magnetic memory device according to  
claim 33, wherein the base board is made of a material  
containing no magnetic particulates, and the resin is  
mixed with a high-permeability magnetic material and  
20 functions as the magnetic guide.

36. A magnetic memory device according to  
claim 35, wherein the high-permeability magnetic  
material includes ferrite of spinel type and ferrite of  
garnet type.

25 37. A magnetic memory device according to  
claim 35, wherein the high-permeability magnetic  
material includes a resin with Mn-Zn ferrite and

an additive, and a resin with yttrium iron garnet and an additive.